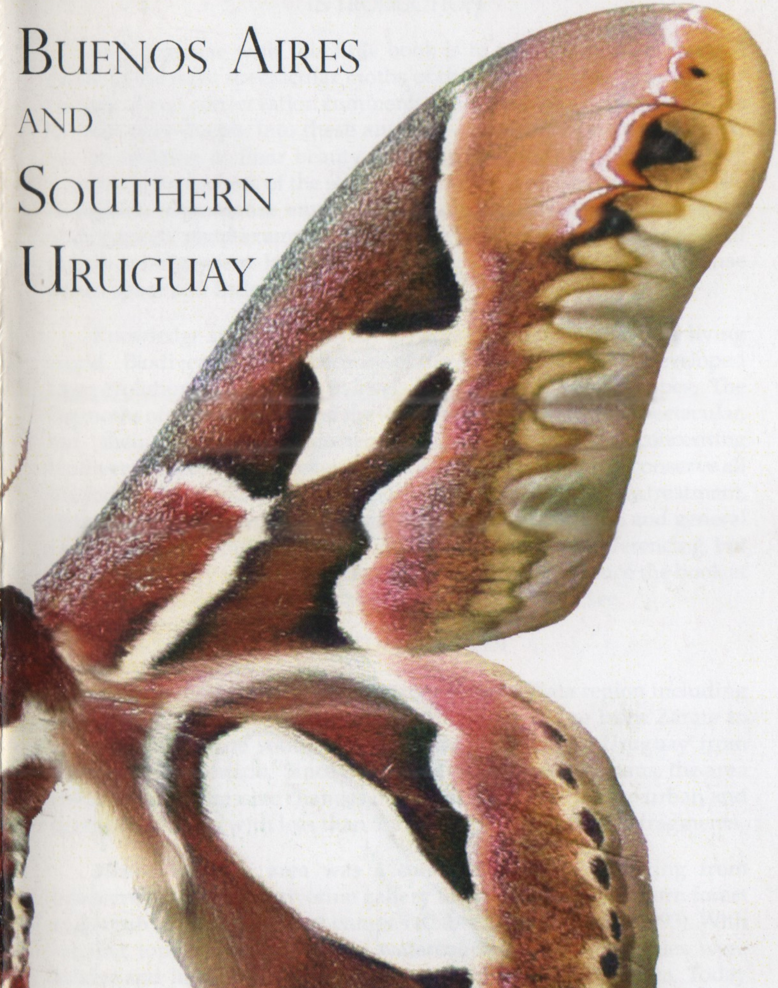
BIG MOTHS OF BUENOS AIRES AND SOUTHERN URUGUAY



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INTRODUCTION

Our objective with this little book is to provide an identification guide to the most spectacular moths of the Río de la Plata region. Our biological and conservation comments are aimed to provoke the reader to look more deeply into these animals – if not all of natural history. For in addition to their beauty and complex life histories, these big insects are metaphors of the status and trends of our own quality of life in relation to immense environmental changes from human activity. They provide vivid examples of the range of biodiversity across a small region with present landscapes ranging from agriculture to dense urban space and little nature remaining.

Knowledge about biodiversity is necessary to understand the living world. Biodiversity exists because of the variety of life that developed from evolutionary processes at levels from genomes to landscapes. The big moths of the region around the Río de la Plata are not only spectacular, but their biological characteristics provide insights concerning biodiversity across many levels with the corollary concern to conserve all life forms. In the space allotted we can only provide a sketchy treatment, but present as complete a guide as possible to identification and general ecology. We apologize for not having space for complete referencing, but include a few key works. The alternative was to not produce the book at all as financial constraint only permitted the pages you see.

THE STUDY REGION

The area of the study is the entire Río de la Plata region including most of urban Buenos Aires that we define by a line from Zárate to Punta Lara and the southern tier of the provinces of Uruguay from Soriano to Maldonado. Since the arrival of European humans, the area has undergone massive changes by landscape conversion to urban and agriculture zones with less than 5% of nature remaining as fragments.

Historically the area was a complex ecosystem ranging from extensive marshes and riverine gallery forest, through dry thorn forest and scrub to various grassy pampas (Cabrera and Zardini, 1993). With varying topography and many watercourses, its communities were patchy and likely had high biodiversity across the total biota. Today no fragments remain that reflect the historic biotas, with the exception of parts of Isla Martín García, some delta islands and a few reserves. There have been massive changes even in these "natural" habitats by invasive plant species across all habitats (Brailovsky and Foguelman, 1991).

Our goal is to document the species that were historically present and those that may still occur. We acknowledge these biotas will never return as they were, even if humans were to totally disappear. We deplore that only sketchy information of the historic world exists. Our work is a best effort, offered as a working hypothesis that attempts to provide a data baseline for the future. It is open to change.

THE BIG MOTHS

Moths comprise over 90% of the species of the order Lepidoptera - the scale- winged insects. Butterflies make up the remainder of the order. The ratio may be far greater as an enormous number of small moths (<6 mm wingspan) remain unknown and undescribed because of lack of support for biodiversity studies. Relative diversity among the moths is reflected by their classification. There are only six families of butterflies, with about 20,000 species worldwide. By comparison moths include some 140 families with about 170,000 named species.

The two moth families described here, Saturniidae and Sphingidae, contain most of the species of the largest moths of the world. Both families together with butterflies are among the best studied insects, with most species likely named. Each family has about 1500 species globally. They are thus invaluable for documenting change in natural communities that result from increased natural resource use, habitat destruction, pollution and finally, climatic change. For identification purposes only, one common species of the family Erebidae is included that is large and may be confused with the two families.

The two families, although closely related by evolutionary history, are extremely different in general appearance of the adult moths, all life stages and ecological adaptations. Wing and body shape are distinct. The saturniids have no mouthparts as adults, while most sphingids have proboscides and serve as important pollinators.

Thus adult saturniids can only live a few days, relying on nutrition carried over from the larval stage. Females are sedentary and stay, mate and lay eggs close to where they eclose. Males, however, may fly several kilometers to mate with females whom they locate by following downwind pheromone trails. Sphingids by contrast, are highly mobile and long lived. Some migrate over 1000 km, while others are sedentary. The evolutionary consequences of these modal movements may be profound. In general all saturniids develop local colonies and may therefore show subspeciation (local adaptation expressed in wing pattern variants) by comparison most sphingids present uniform patterns over entire species ranges.

In terms of conservation biology, our knowledge only includes species which are known from the Buenos Aires area. We have no information of those found in Southern Uruguay. Of the 16 saturniids historically known, all are still present. Of the 26 recorded Buenos Aires sphingids, at least six have disappeared. Further, five of the saturniid species have breeding populations throughout the urban area because of widespread use of their tree foodplants in landscaping. Five sphingids may wander into urban zones, and the tomato feeding *Manduca sexta* and *M. diffissa* will be found wherever a tomato plant grows, including downtown windowboxes.

LIFE HISTORIES OF THE BIG MOTHS

Growth of all moths involves a complete metamorphosis, starting with an ovum (egg) that hatches to produce a larva. The larva is the

eating machine that increases in size by casting off its external skeletal skin five or more times. The larva finally seeks a protected place where it transforms into the pupa that produces the adult moth. Some species may form elaborate cocoons while others pupate underground. Foodplant usage varies among species, some being specific to one plant species (monophagous) while others feed on a wide variety of plants (polyphagous). The patterns of food preference, from general to highly specific, is a subject of great research interest.

The larva of most species and a few pupae are illustrated. The images show some of the remarkable variation in form and beauty of early stages themselves. The usual life histories of the two groups are quite different (pp 30 - 33). Saturniid larvae usually have many bristles. The bristles of most larvae of the subfamily Hemileucinae cause extreme irritation when touched (urticating) and must be handled with extreme care. Sphingid larvae are smooth, usually brightly colored and patterned, and may be quite variable within any species. Most have a hooked horn on the dorsal rear.

Pupation of most South American saturniids involves the larva spinning a loose silken cocoon amongst the litter or on the ground. Sphingids usually pupate in a cell formed in the soil or debris near the foodplant. The distinctive "handle" found on a few sphinx pupae illustrated on page 31, encloses the developing proboscis.

Adults of most species of both families are nocturnal, but dayfliers occur and are noted in the species accounts.

Most species from temperate and sub-tropical regions require a period of arrested development, called diapause, which enables them to survive winter cold - here - or hot dry summers in other areas. The pupa is the diapause stage for both families. For detailed information on Lepidoptera biology refer to the invaluable book by Scoble cited below. The subject is fascinating and the diversity of patterns stunning.

We emphasize the inadequate biological data for many species. Life history studies and surveys are needed to accurately determine times of appearance, foodplants and distribution. The pattern of foodplant use by the generalist feeders is likely to vary geographically. We believe all species listed occurred in the region. However, it is likely several additional sphingid species will be found with more intensive collecting.

CLIMATE CHANGE

Definitive evidence indicates global temperatures have been increasing, a trend started over a century ago. The cause correlates with uncontrolled carbon gas emissions, and the trend appears irreversibly entrained. In the Río de la Plata region the warming could result in habitat shifts from north to south. Thus sub-tropical species now on the edge of their ranges may have more favorable environments with the shifting of their distributions southward. In the northern hemisphere many species have moved northward. Anecdotal evidence of the trend underway includes the recent observation of the butterfly *Doxocopa*

kallima, now established around La Plata where it was unknown earlier.

Across the Río de la Plata region large historic biological changes are only known in broad terms. It is now time to initiate surveys of moth (and other indicator organism) populations to provide a quantitative record of future changes that are likely to occur. The biogeographic "edge" (**ER**) at the Río de la Plata appears of great significance as the boundary between the (formerly) vast subtropical river forest and the pampas.

BIOLOGICAL DATA AND SPECIES ACCOUNTS

Our classification and nomenclature follows Kitching and Cadiou (2000) for the Sphingidae and Lemaire (2002) for the Saturniidae. There have been a number of more recent changes and updates, not all generally accepted but we support a stable nomenclature pending scholastic revisions.

The data for each species uses the following abbreviations:

sp., species, **spp.**, species plural, **ssp.**: subspecies. Author and date of naming are given for each. We have not cited any subspecies as their status is controversial and we feel would be confusing.
** indicates species you can expect to find almost without fail in an appropriate habitat during the flight season.
X before the species number indicates species that are apparently extirpated from greater BsAs, there are little data for Uruguay.
ND no data available
Figure captions ♂, male, ♀; female; uns, underside
GD: Geographic distribution. SA, South America, AR, Argentina; BsAs, Buenos Aires, UY, Uruguay; CL, Chile; PY, Paraguay; BR, Brazil; BO, Bolivia. **ER**, Edge of range
HAB: Habitat as plant community association:

- RI: Riparian forest
- DF: Dry forest
- ES: Espinal scrub
- PA: Pampa, perennial grassland
- U: Universal, can be found anywhere (garden species)
- UN: Universal only in natural areas
- RU: Ruderal, disturbed areas including urban zones

V: Voltinism, the number of generations per year; U, univoltine; B, bivoltine: M, multivoltine, three or more generations per year.
AF: Adult flight period with months abbreviated data from collections, published records and anecdotal data.
RA: Relative abundance are maximum numbers seen on best days () number at optimum locality, from published and anecdotal data.

HP: Hostplants with range of plant species used, by family. (?) doubtful records. **Poly**, polyphagous, feed on plants in more than one plant family; **Oligo**, oligophagous, feed on 2 or more genera in one family; **Mono**, monophagous: restricted to one genus.
Specimens figured about 2/3 natural size unless otherwise noted.

SPHINGIDAE
SPHINGINAE

In this and the following subfamily the larvae are almost all monomorphic within a species and pupate underground in a cavity lined with silk.

1. **Agrius cingulata** (Fabricius, 1775)

♂

GD: So. AR, Malvinas to So. USA. **HAB**: U. **V**: M. **AF**: Sep-Apr. **RA**: >20 (0-1). Regular long distance migrant. **HP**: **Poly**: Annonaceae, Asteraceae, Convolvulaceae, Solanaceae.

2. **Cocytius antaeus** (Drury, 1773)

The actual specimen is twice the size of the illustration

♀

GD: BsAs (ER) UY to No. USA. **HAB**: UN. **V**: M. **AF**: Sep-Apr. **RA**: << 1, sporadic long distance migrant. **HP**: **Poly**: Annonaceae. Only known in BsAs from one record, a copulating pair from Tigre (1990) (Leonardo Aguado).

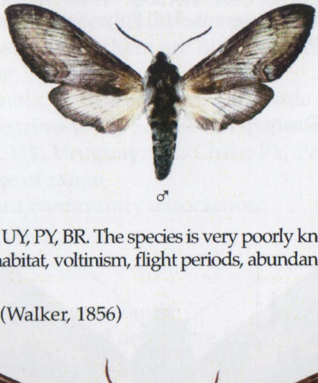
3. **Neococytius cluentius** (Cramer, 1776)

The actual specimen is twice the size of the illustration

♂

GD: No AR (not BsAs), UY to So. USA. **HAB**: UN **V**: M **AF**: Sep-Apr **RA**:<< 1, sporadic migrant. **HP**: **Oligo**: Annonaceae, Piperaceae. It has the longest proboscides of any moth (255 mm). Common in Brazil.

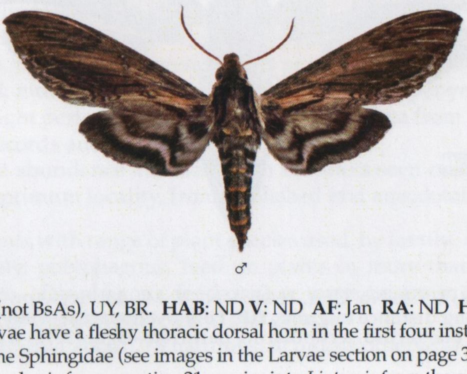
4. **Neogene reevei** (Druce, 1882)



♂

GD: No. AR (not BsAs), UY, PY, BR. The species is very poorly known and no information is available concerning habitat, voltinism, flight periods, abundance or life history.

5. **Lintneria justiciae** (Walker, 1856)



♂

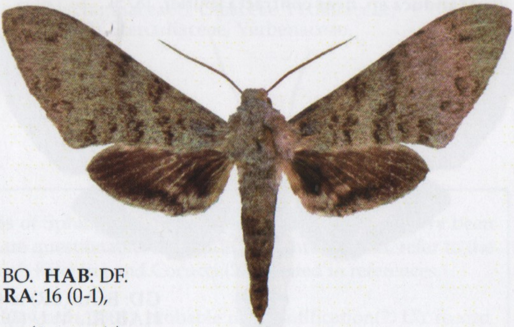
GD: No. AR (not BsAs), UY, BR. **HAB**: ND **V**: ND **AF**: Jan **RA**: ND **HP**: **Mono**: Lamiaceae. Larvae have a fleshy thoracic dorsal horn in the first four instars, a unique character in the Sphingidae (see images in the Larvae section on page 32) that Jim Tuttle used as a basis for separating 21 species into *Lintneria* from the genus *Sphinx*.

6. **Manduca armatipes** (Rothschild & Jordan, 1916)

♂

GD: No. AR, UY to BO. **HAB**: Forest, wet and dry, ES **V**: M (?)**AF**: Nov-Feb **RA**: > 20 (0-1) **HP**: ND. Penco found *M. armatipes* among the three most common sphingids in the Tucuman yungas. Wing pattern was continuously variable to ***M. bergarmatipes*** (Clark, 1927), which species has also been reported from Uruguay. We treat them as conspecific but further study is required.

X? 7. **Manduca bergi** (Rothschild & Jordan, 1903)



♂

GD: BsAs (**ER**), UY to BO. **HAB**: DF. **V**: B (?). **AF**: Oct-Apr. **RA**: 16 (0-1), migratory **HP**: **Oligo**: Bignoniaceae (*Jacarandá*).

8. **Manduca undata** (Rothschild & Jordan, 1903)

♂

GD: No. AR (not BsAs), UY, PY. **HAB**: ND **V**: M (?) **AF**: Dec-Mar. **RA**: ND **HP**: ND

9. **Manduca sexta (Linnaeus, 1763)

♂

GD: Central AR to Canada. **HAB**: U. **V**: M. **AF**: Oct-Apr. **RA**: >20, strongly migratory. **HP**: **Poly**: (Anacardiaceae?), (Asteraceae?), Brassicaceae, (Cannaceae?), Convolvulaceae, (Geraniaceae?), (Myrtaceae?), Pedaliaceae, Solanaceae (*Capsicum, Cestrum, Nicotiana, Solanum*), Verbenaceae. A major agricultural pest. An extensive literature on the biology of *M. sexta* is available because of its importance to agriculture and as an experimental animal.

10. **Manduca sp. near contracta** (Butler, 1875)

♂

GD: BsAs (**ER**) to Central America. **HAB**: RI. **V**: U (?). **AF**: Feb. **RA**: 0-1. **HP**: **Oligo**: Solanaceae, (Piperaceae?). This is a new species in process of description by J. Hexaire.

11. **Manduca diffissa (Butler, 1871)

♂

GD: SA Central AR to Central America. **HAB**: U. **V**: M. **AF**: Oct-Mar. **RA**: >20, migratory. **HP**: **Oligo**: Solanaceae (*Lycopersicon*). Anecdotal information sugests that *M. diffissa* is replacing *M. sexta* in Buenos Aires. Complex pattern variation geographically.

12. **Manduca rustica (Fabricius, 1775)

♂

GD: central AR to central USA. **HAB**: U. **V**: M. **AF**: Sep-Apr. **RA**: >20, migratory. **HP**: **Poly**: Acanthaceae, Annonaceae, Araliaceae, Asteraceae, Bignoniaceae, Boraginaceae, Convolvulaceae, (Euphorbiaceae?), Lamiaceae, (Lythraceae?), Malvaceae, (Nyctaginaceae?), Oleaceae, Pedaliaceae, (Rubiaceae?), (Scrophulariaceae?), Sterculiaceae, Verbenaceae.

The following species of Sphingidae occur near the study area or have been cited in the area but are questionable. For additional information, refer to the excellent book by Moré, Kitching and Cocucci (2005) cited in references.

M. quinquemaculata (Haworth, 1803) probable misidentification(?) UY record

Aellopos fadus (Cramer, 1775)
Aleuron chloroptera (Perty, 1833)
Callionima parce (Fabricius, 1775)
Enyo ocypete (Linneaus, 1758)
Erinnyis crameri (Schaus, 1898)
Isognathus caricae (Linnaeus, 1758)
I. leachii (Swainson, 1823)
Perigonia passerina (Boisduval, 1870)
P. pallida (Rothschild & Jordan, 1903)

13. **Orecta lycidas** (Boisduval, [1875])

♂

GD: BsAs (**ER**) to No. SA. **HAB**: RI? **V**: ND **AF**: ND **RA**: (0-1), local, sedentary. **HP**: **Oligo**: Lauraceae.

14. **Adhemarius gannascus** (Stoll, 1790)

♂

GD: No. AR (not BsAs), UY to Mexico. **HAB**: DF **V**: M **AF**: Sep-Jun **RA**: 20 (0-1) **HP**: **Poly**: Lauraceae, (Rubiaceae?).

15. **Protambulyx strigilis** (Linnaeus, 1771)

♂

GD: UY to So. USA. **HAB**: DF **V**: M **AF**: Sep-Apr **RA**: 3 (0-1), migratory. **HP**: **Poly**: Anacardiaceae, Erythroxylaceae, Simaroubaceae, (Asteraceae?), (Smilacaceae?). Two adult color forms: figured and red-brown.

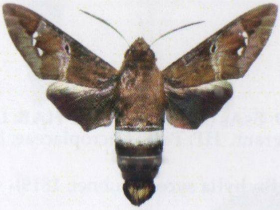
The larvae of most species are polymorphic in color and maculation with pupation usually on the surface of the ground within a loose cocoon.

16. **Aellopos titan** (Cramer, 1777)

♂

GD: BsAs (**ER**) to so, USA. **HAB**: RI
V: M? **AF**: Nov-Apr. **RA**: (0-2), dayflier
HP: **Poly**: Rubiaceae, (Buddlejaceae?)

X 17. **Aellopos tantalus** (Linnaeus, 1758)



♂

GD: BsAs (**ER**) to No. USA. **HAB**: U
V: M? **AF**: Oct-Feb **RA**: (0-2), migratory, dayflier. **HP**: **Poly**: (Combretaceae, Rubiaceae?).

X 18. **Enyo lugubris** (Linnaeus, 1771)

♂

GD: BsAs (**ER**) to No. USA. **HAB**: U.
V: M. **AF**: Sep-Apr. **RA**: >20 (0-1), migratory. **HP**: **Poly**: Dilleniaceae, (Rosaceae?), (Rubiaceae?), Vitaceae. BsAs. Rare at this time, records recent so may be expanding range.

X 19. **Nyceryx alophus** (Boisduval, [1875])

♂

GD: BsAs (**ER**), BO, UY, BR, PY.
HAB:ND
V: M **AF**: Oct-Apr **RA**: (0-1) **HP**: (Rubiaceae?)

X 20. **Eupyrrhoglossum sagra** (Poey, 1832).

♀

GD: BsAs (**ER**) to So. USA. **HAB**: RI, DF. **V**: M. **AF**: Oct-Apr **RA**: 1 (0-1), dayflier. **HP**: ?**Mono**: Rubiaceae (*Guettarda*)

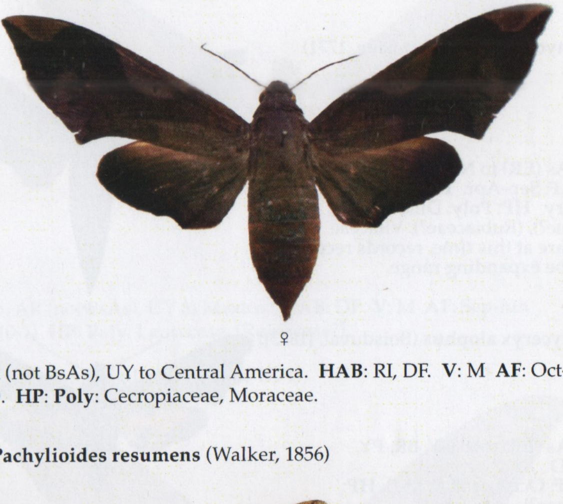
All the specimens on this page are life size

21. **Pachylia ficus** (Linnaeus, 1758)

♀

GD: BsAs (**ER**) to So. USA. **HAB**: U. **V**: M **AF**: Oct-Apr **RA**: 1 (0-1), regular migrant. **HP**: **Poly**: Cecropiaceae, Moraceae (*Ficus*), (Myrtaceae?).

22. **Pachylia syces** (Hubner, 1819)



♀

GD: AR (not BsAs), UY to Central America. **HAB**: RI, DF. **V**: M **AF**: Oct-Apr. **RA**: ND. **HP**: **Poly**: Cecropiaceae, Moraceae.

X? 23. **Pachylioides resumens** (Walker, 1856)

♂

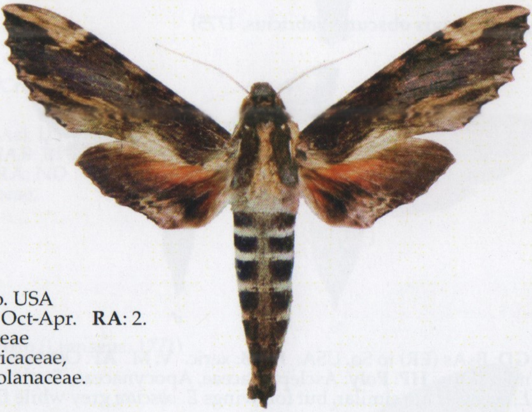
GD: BsAs (**ER**) to Central America **HAB**: U. **V**: M. **AF**: Oct-Mar. **RA**: 10 (0-1) **HP**: **Poly**: Apocynaceae, Moraceae (*Ficus*). Common prior to 1980's (Joaquín Carreras) now apparently extirpated in BsAs.

24. **Erinnyis alope** (Drury, 1770)

GD: BsAs (**ER**) to So. USA. **HAB**: U **V**: M
AF: Sep-Apr. **RA**: >20 (0-1), migratory.
HP: **Poly**: Apocynaceae, Asclepiadaceae, Caricaeae, Euphorbiaceae.

♂

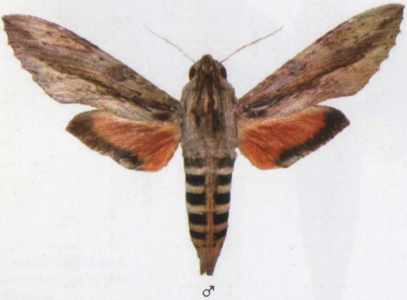
X 25. **Erinnyis lassauxii** (Boisduval, 1859)



GD: BsAs (**ER**) to So. USA
HAB: R. **V**: M. **AF**: Oct-Apr. **RA**: 2.
HP: **Poly**: Apocynaceae Asclepiadaceae, Caricaceae, (Euphorbiaceae?), Solanaceae.

♂

26. **Erinnyis ello** (Linnaeus, 1758)



♂ ♀

GD: BsAs (**ER**) to So. USA. **HAB**: U. **V**: M. **AF**: Sep-Apr. **RA**: >20 (1).
HP: **Poly**: Apocynaceae, Asclepiadaceae, Caricaceae, Chrysobalanaceae, Euphorbiaceae, Malvaceae, Moraceae, Myrtaceae, (Pedaliaceae?), Sapotaceae, Solanaceae, (Urticaceae?), (Vitaceae?).

27. **Erinnyis oenotrus** (Cramer, 1780)

♂

GD: BsAs (**ER**) to Central America. **HAB**: ND **V**: M. **AF**: Oct-Apr. **RA**: 15 (0-1), migratory. **HP**: **Poly**: Apocynaceae, Euphorbiaceae. Note that this species is significantly larger than the following two and can be separated by size.

28. **Erinnyis obscura** (Fabricius, 1775)

♂

GD: BsAs (**ER**) to So. USA. **HAB**: xeric. **V**: M. **AF**: Oct-Jun. **RA**: 5 (0-1), migratory. **HP**: **Poly**: Asclepiadaceae, Apocynaceae, Euphorbiaceae. This and *E. oenotrus* are similar, but forewings *E. obscura* grey while *E. oenotrus* brown.

Erinnyis domingonis (Butler, 1775)

♂

A common a form of *obscura* (above), earlier recognized as a species (*E. domingonis* Butler, 1775). Variation between this form and the species is continuous. The conspecificity has been recognized by J. Hexaire in 2000 and later by J. Tuttle in his book (2007). Distribution and biological data are identical to the species.

29. Callionima grisescens (Rothschild, 1894)

GD: No. AR (not BsAs), UY to BO, BR. **HAB**: DF, ES **V**: M **AF**: Oct-Apr **RA**: ND
HP: **Oligo**: Apocynaceae. Adults dimorphic, forewings blue-grey or orange-brown.

Life size

♂

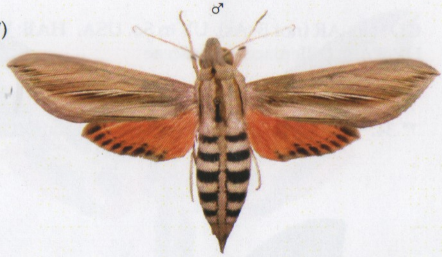
30. **Perigonia ilus** (Boisduval, 1875)

GD: No. AR (not BsAs), UY to BO, BR. **HAB**: ND **V**: B? **AF**: Nov-Apr **RA**: 0-1 uncommon everywhere **HP**: **Poly**: Aquifoliaceae, Rubiaceae.

♂

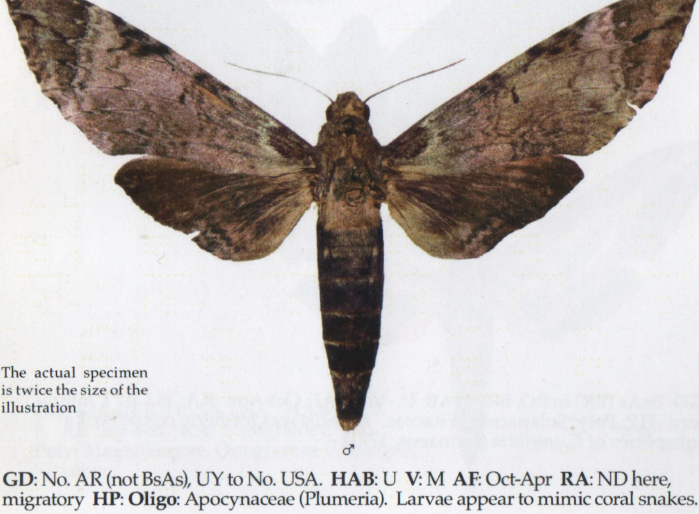
31. **Phryxus caicus** (Cramer, 1777)

GD: No. AR (not BsAs), UY to Central America. **HAB**: RI **V**: M **AF**: Oct-Apr **RA**: ND **HP**: **Poly**: Apocynaceae, Caricaceae.



♂

32. **Pseudosphinx tetrio** (Linnaeus, 1771)



The actual specimen is twice the size of the illustration

♂

GD: No. AR (not BsAs), UY to No. USA. **HAB**: U **V**: M **AF**: Oct-Apr **RA**: ND here, migratory **HP**: **Oligo**: Apocynaceae (Plumeria). Larvae appear to mimic coral snakes.

33. **Eumorpha anchemolus** (Cramer, 1779)

♂

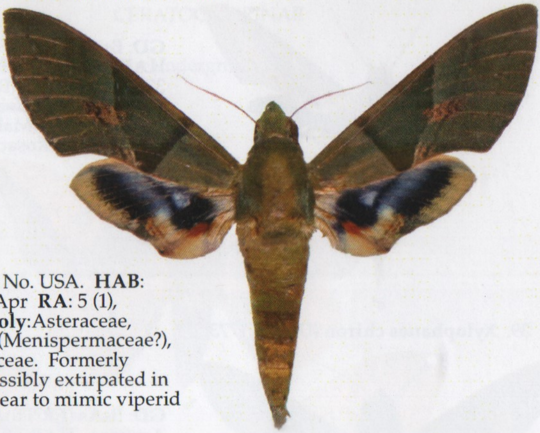
GD: No. AR (not BsAs), UY to So. USA. **HAB**: U **V**: M **AF**: Oct-Apr **RA**: ND
HP: **Poly**: Dilleniaceae, Vitaceae

** 34. **Eumorpha analis** (Rothschild & Jordan, 1903)

♂

GD: BsAs (**ER**) to BO, BR. **HAB**: U. **V**: B. **AF**: Oct-Apr. **RA**: 16 (1-2), migratory. **HP**: **Poly**: Solanaceae, Vitaceae. *E. analis* was formerly considered a subspecies of *E. satellitia* (Linnaeus, 1771).

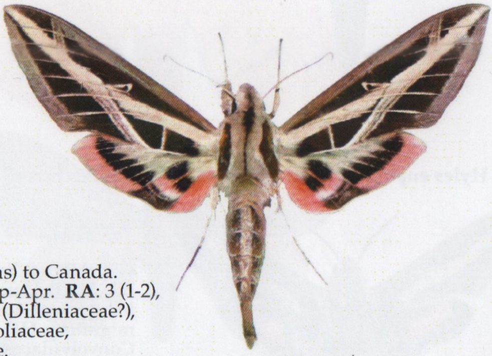
35. **Eumorpha labruscae** (Linnaeus, 1758)



GD: BsAs (**ER**) to No. USA. **HAB**: U. **V**: B **AF**: Oct-Apr **RA**: 5 (1), migratory. **HP**: **Poly**:Asteraceae, (Magnoliaceae?), (Menispermaceae?), Onagraceae, Vitaceae. Formerly common, now possibly extirpated in BsAs. Larvae appear to mimic viperid snakes.

♂

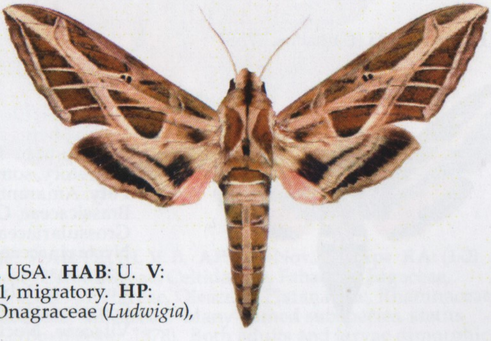
36. **Eumorpha fasciatus** (Sulzer, 1776)



GD: So. AR (Malvinas) to Canada. **HAB**: U **V**: B **AF**: Sep-Apr. **RA**: 3 (1-2), migratory. **HP**: **Poly**: (Dilleniaceae?), (Lythraceae?), Magnoliaceae, Onagraceae, Vitaceae.

♂

X 37. **Eumorpha vitis** (Linnaeus, 1758)



GD: BsAs (**ER?**) to So. USA. **HAB**: U. **V**: B. **AF**: Sep-Feb. **RA**: 1, migratory. **HP**: **Poly**: Magnoliaceae, Onagraceae (*Ludwigia*), Vitaceae.

♂

38. **Xylophanes tersa** (Linnaeus, 1771)

♂

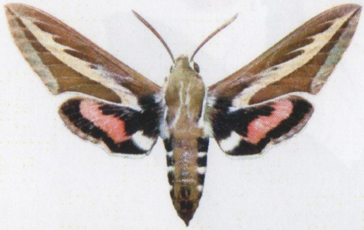
GD: BsAs (**ER**) to So. Canada. **HAB**: U. **V**: M. **AF**: Sep-Apr. **RA**: 37 (1) **HP**: **Poly**: (Bignoniaceae, Ebenaceae?), Fabaceae, (Lythraceae?), (Malvaceae, Myrtaceae?), Rosaceae, Rubiaceae.

X 39. **Xylophanes chiron** (Drury, 1773)

♂

GD: BsAs (**ER?**) to Central America. **HAB**: RI. **V**: M? **AF**: Sep-Dec. **RA**: 4 (1), migratory. **HP**: **Poly**: Caricaceae, Rubiaceae.

40. **Hyles euphorbiarum** (Guérin-Méneville & Percheron, 1835)



♂

GD: AR (not BsAs), CH, UR, BR. **HAB**: U xeric habitats. **V**: M. **AF**: Oct-Apr. **RA**: >> 20 (0-1), migratory. **HP**: **Poly**: Asteraceae, Convolvulaceae, Euphorbiaceae, Fabaceae, Nyctaginaceae, Onagraceae, Polygonaceae, Portulacaceae, Rosaceae, Solanaceae.

41. **Hyles lineata** (Linnaeus, 1758)

♀

GD: BsAs (**ER**) to CA, No. Hemisphere. **HAB**: U **V**: M **AF**: Sep-May **RA**:>> 20 (0-1), migratory, some in masses. **HP**: **Poly**: Amaranthaceae, Asteraceae, Brassicaceae, Cucurbitaceae, Grossulariaceae, Malvaceae, Nyctaginaceae, Onagraceae, Polygonaceae, Portulacaceae, Rosaceae, Rubiaceae, Scrophulariaceae, Solanaceae, Vitaceae. Nocturnal and diurnal. Larvae migrate.

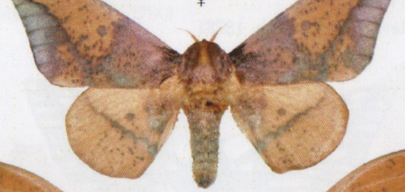
SATURNIIDAE
CERATOCAMPINAE

Larvae not urticating. Pupate on or underground

1. **Eacles imperialis (Drury, 1773)

♂

♀



♂

♀

GD: No. AR to Canada. **HAB**: DF, RI. **V**: B. **AF**: Sep-Nov, Feb-Apr **RA**: (1-2)
HP: **Poly**: Anacardiaceae, Cannabaceae, Celtidaceae, Fabaceae, Fagaceae, Hamamelidaceae, Lauraceae, Myrtaceae, Oleaceae, Platanaceae, Rhamnaceae, Rosaceae, Rutaceae, Fabaceae, Salicaceae. Many named subspecies, status unclear, here ssp. *opaca* (Burmeister, 1878). Both adults and larvae dimorphic. Dark adult form commonest here. Larvae green or brown.

2. **Citheronia brissotii (Boisduval, 1868)

♂

♀

GD: Central AR to BO and BR. **HAB**: DF, RI. **V**: B. **AF**: Sep-Nov, Feb-Apr. **RA**: (1-2). **HP**: **Poly**: Aquifoliaceae, Euphorbiaceae, Fabaceae, Juglandaceae, Lauraceae, Oleaceae, Rosaceae, Rutaceae, Salicaceae.

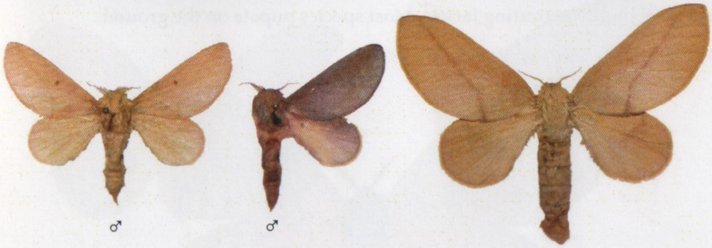
3. **Citheronia vogleri** (Weyenbergh, 1878)

♂

♀

GD: No. AR (not BsAs), UY, BO, PY, BR. **HAB**: DF, RI. **V**: B **AF**: ND **RA**: ND
HP: **Poly**: Anacardiaceae, Loranthaceae, Myrtaceae, Rosaceae.

4. **Psilopygida crispula** (Dognin, 1905)



♂ ♂ ♀

GD: BsAs (**ER**), BR, BO, PY. **HAB**: RI. **V**: B. **AF**: Sep-Nov, Feb-Apr. **RA**: (0-1). **HP**: **Oligo**: Fabaceae (*Acacia caven, Prosopis sp.*) First records recent from Zarate, rare but moving south. Adults dimorphic, ochre or red.

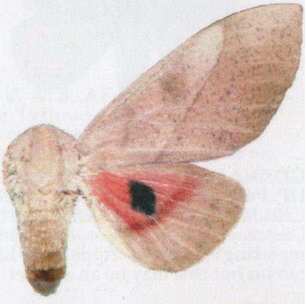
5. **Giacomellia bilineata** (Burmeister, 1878)

♂

GD: No. AR (not BsAs), UY to Peru, BR. Flies in dry areas (Daniel Herbin, in Bolivia). We have no further information on life history.

6. **Syssphinx molina** (Cramer, 1780)

♂



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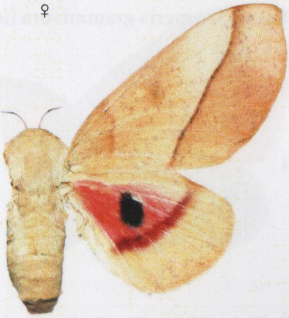


♀

GD: BsAs (**ER**) to central America. Highly polymorphic. **HAB**: DF. **V**: B. **AF**: Sep-Nov, Feb-Apr. **RA**: (0-1). **HP**: **Poly**: Anacardiaceae, Fabaceae, Rhamnaceae.
Adults highly polymorphic, two female varieties shown.

All have highly urticating larvae. Most species pupate on the ground.

7. **Automeris coresus** (Boisduval, 1859)

♂

GD: BsAs (**ER**), BR. **HAB**: DF, RU **V**: M. **AF**: Nov-Jan. **RA**: (0-1)
HP: **Poly**: Aceraceae, Cupressaceae, Fabaceae, Fagaceae, Hamamelidaceae, Plantaginaceae, Rhamnaceae, Rosaceae. Male illustrated, females similar vs congenerics. Most common along the Atlantic coast. All populations declining, see *A. naranja* below. Arboreal pupae.

8. **Automeris naranja Schaus, 1898

♂

♀

GD: BsAs (**ER**) to PY, BR **HAB**: DF, RU **V**: B. **AF**: Sep-Nov, Feb-Apr. **RA**: (1-3)
HP: **Poly**: Annonaceae, Aquifoliaceae, Bignoniaceae, Caprifoliaceae, Celtidaceae, Fabaceae, Lauraceae, Malvaceae, Myrtaceae, Platanaceae, Oleaceae, Salicaceae, Rosaceae, First appeared in BSAs in 1960's and since replacing *A. coresus*. Appears to have greater range of hostplants than *A. coresus* but this may be an artifact. Arboreal pupae

9 **Pseudautomeris grammivora** (Jones, 1908)

♂

♀

GD: BsAs (**ER**) to BR. **HAB**: marshes. **V**: B. **AF**: Sep-Nov, Feb-Mar. **RA**: (0-1)
HP: **Poly?**: (Poaceae?) *Rottboelia compressa* (cited by Bourquin). Typhaceae, *Typha* sp. (new host plant det. by Penco). Arboreal pupae.

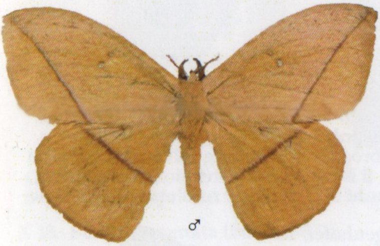
10. **Hyperchiria incisa** (Walker, 1855)

♂

♀

GD: No. AR (not BsAs), UY to BR, BO, Perú. **HAB**: Forest. **V**: ND. **AF**: ND. **RA**: ND. **HP**: **Poly**: Berberidaceae, Cannabinaceae, Fabaceae, Myrtaceae, Rosaceae, Sapindaceae.

11. **Lonomia obliqua** (Walker, 1855)



♂

♀

GD: No. AR (not BsAs), UY to No. SA. **HAB**: U. **V**: B. **AF**: RA. **HP**: **Poly**: Anacardiaceae, Bignoniaceae, Fabaceae, Lythraceae, Moraceae, Pittosporaceae, Platanaceae, Rosaceae, Rutaceae. Larva spines produce serious induced internal bleeding and may be fatal. The larva depicted on page 32 belongs to *Lonomia achelous*. The larvae of the two species are very similar. There is a recently described new species, *L. parobliqua* Brechlin, Meister & Mielke, 2011 from the region and from illustrations it appears essentially identical to *obliqua*. Larvae gregarious.
The species is polymorphic in color, varying from yellow to green and red.

12. **Periga circumstans** (Walker, 1855)

♂

♀

GD: No. AR (not BsAs), UY, PY, BR. **HAB**: ND **V**: ND **AF**: ND **RA**: ND **HP**: **Poly**: Combretaceae, Rubiaceae. Is a pest on Coffee in Brazil.

13. **Leucanella viridescens** (Walker, 1855)

♂

♀

GD: BsAs (**ER**) to BR. **HAB**: RI. **V**: B. **AF**: Sep-Nov, Feb-Apr. **RA**: (0-1). **HP**: **Poly**: Aceraceae, Aquifoliaceae, Caprifoliacaeae, Fabaceae, Meliaceae, Oleaceae, Rhamnaceae, Rosaceae, Rubiaceae, Solanaceae, Salicaceae.

14. **Leucanella memusae (Walker, 1855)**

♂

♀

GD: BsAs (**ER**) to BR **HAB**: RI **V**: B **AF**: Sep-Nov, Feb-Apr **RA**: (0-1) **HP**: Same as *L. viridescens* (above) from which it can only be reliably separated by the larvae (see figures) as adult variation is broadly overlapping. All other biological and ecological characters also the same. It is clear that the relationship of these two taxa demands further study and we do not claim any resolution at this time.

15. **Leucanella aspera** (R. Felder & Rogenhofer, 1874)

♂

♀

GD: Central AR to BR and BO. **HAB**: RI **V**: B **AF**: Sep-Nov, Feb-Apr **RA**: (0-1). **HP**: **Poly**: Anacardiaceae, Apocynaceae, Fabaceae, Oleaceae, Tamaricaceae, Ulmaceae. Adults dimorphic, only the yellow form present in the area.

16. **Hylesia nigricans (Berg, 1875)

♂

♀

GD: AR, UY, PY, BR **HAB**: RI, DF, RU **V**: B. **AF**: Sep-Nov, Feb-Apr. **RA**: 20 (1-2). **HP**: **Poly**: Aceraceae, Arecaceae, Asteraceae, Anacardiaceae, Aquifoliaceae, Ebenaceae, Fagaceae, Hamamelidaceae, Juglandaceae, Lauraceae, Myrtaceae, Platanaceae, Poaceae, Rosaceae, Rubiaceae, Salicaceae, Solanaceae, Tiliaceae, Ulmaceae . Arboreal pupae. Larvae and adults extremely urticating and may injure eyes and induce dermatitis. Larvae gregarious.

17. **Eudyaria zeta** (Berg, 1885)

GD: Central AR, UR, BR, BO. **HAB**: ES, coastal and inland dunes. **V**: B. **AF**: Sep-Oct, Feb-Apr. **RA**: 10 (1-2). **HP**: **Mono**: Apiaceae (*Eryngium)*

X 18. **Eudyaria venata** (Butler, 1871)

GR: Central AR, UY, BR, PY. **HAB**: DF, ES . **V**: B. **AF**: Sep-Oct, Feb-Apr. **RA**: 0-1 **HP**: **Mono**: Apiaceae (*Eryngium*). Only known from one record from Río Luján, 1960's.

19. **Ithomisa kinkelini** (Oberthür, 1881)

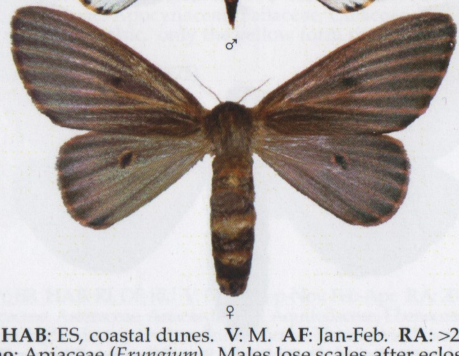
♂

♀

GD: AR. **HAB**: DF, ES. **V**: M. **AR**: Jan-Feb. **RA**: 0-1 Dayflying. **HP**: **Mono**: Apiaceae (*Eryngium*). The larvae appear in April and intermittently hibernate through winter, pupating in October. The following species has the same life history pattern. Males lose their scales upon eclosion, thus appearing transparent. Highly sexually dimorphic.

20. **Heliconisa pagenstecheri** (Geyer, 1835)

♂



♀

GD:AR, UY. **HAB**: ES, coastal dunes. **V**: M. **AF**: Jan-Feb. **RA**: >20 (0-1) Dayflying. **HP**: **Mono**: Apiaceae (*Eryngium*). Males lose scales after eclosion. In some years swarm at Pinamar dunes.

SATURNIINAE

Larvae non-urticating, arboreal cocoons, nocturnal

21. **Rothschildia jacobaeae (Walker, 1855)

♂

GD: BsAs (**ER**) UY, BR, PY, BO. **HAB**: RI, DF, Urban. **V**: B **AF**: Sep-Apr. **RA**: 1-2. **HP**: **Poly**: Aquifoliaceae, Asteraceae, Bignoniaceae, Caricaceae, Euphorbiaceae, Malvaceae, Oleaceae, Rosaceae, Rubiaceae, Sapindaceae. Formerly extremely common. When street lights were first installed in Buenos Aires they were so abundant they blocked light emission and were considered a pest.

EREBIDAE

Ascalapha odorata (Linnaeus, 1758)

♂

GD: AR to Canada. **HAB**: U. **V**: M. **AF**: Oct-Apr. **RA**: (0-1) highly migratory. **HP**: **Oligo**: Fabaceae. Two other very large moths, *Thysania agrippina* (Cramer 1776) and *T. zenobia* (Cramer 1777) have been recorded from southern Uruguay but are quite rare here.


Agrius cingulata


Cocytius antaeus


Lintneria justiciae (note frontal horn)


Lintneria justiciae


Manduca sexta


Manduca diffissa


Manduca rustica


Manduca rustica


Aellopos titan


Aellopos titan


Enyo lugubris


Eupyrrhoglossum sagra

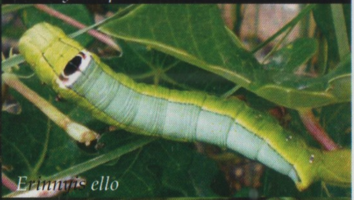

Pachylia ficus


Pachylia ficus


Pachylioides resumens


Erinnys alope


Erinnyis lassauxii


Erinnyis ello


Erinnyis oenotrus


Erinnyis obscura


Eumorpha analis


Eumorpha analis


Eumorpha labruscae


Eumorpha fasciatus


Xylophanes tersa


Xylophanes tersa


Manduca sexta


Erinnyis ello


Eacles imperialis


Eacles imperialis


Citheronia brissotii


Citheronia vogleri


Psilopygida crispula


Syssphinx molina


Automeris coresus


Automeris naranja


Pseudautomeris grammivora


Hyperchiria incisa


Lonomia achelous


Periga circumstans


Leucanella viridescens

Leucanella memusae

Leucanella aspera

Hylesia nigricans

Eudyaria zeta

Ithomisa kinkelini

Ithomisa kinkelini

Heliconisa pagenstecheri

Rothschildia jacobaeae

Rothschildia jacobaeae

Eacles imperialis

Syssphinx molina

THE VALUE OF COLLECTING AND COLLECTIONS

There is a widespread public view that collecting butterflies and moths in nature should be banned – and many countries have very unfortunately enacted such laws. We cannot overemphasize the absolute requirement of specimens for study. Opposition to collecting is both misinformed and intellectually insupportable. Such bans have been enacted for political theater as a cheap trick to excuse massive environmental insults. It is data from scientific collections that record the state of biodiversity. World wide more butterflies and moths are killed every few hours by habitat destruction and pesticide use than have been collected across all history. That issue is muted and disguised while hindering science.

Another aspect is discouraging children from learning about nature under the phony guise of ethical behavior. Please refer to the statement by Sir Richard Attenbourgh: *www.scitechreport.com/cluster1812470/*

We recognize that serious commercial insect over-collecting does occur. We deplore such activity, but even it is minor in the broad picture.

ON IDENTIFICATION AND CLASSIFICATION

The enormous variation among all organisms at any moment is neither random nor chaotic, but occurs as patterns of clusters of interbreeding populations of similar individuals. Such clusters are recognized these by their appearance based on shared similar characteristics. Groups of one to many similar appearing clusters are recognized as species. At any given point in space and time species are usually unequivocally definable. Many species vary geographically and therein species definition becomes subjective. Geographic variants are scientifically recognized as subspecies, but the decision then becomes whether the variant "subspecies" clusters should be classified as species.

The topic of species definition is complex, has been a subject of major intellectual controversy in biology for some time - and is well beyond the scope of this study. We strongly emphasize that the concept of species – and objective classification of biodiversity - although beyond universal definition, is of extraordinary value in describing the pattern of living things. These patterns are the result of the Darwinian explanation of evolution by natural selection (including stochastic, or chance, processes that we certainly cannot go into here). The process of evolution is the underpinning of biological science.

Taxonomy, the science of classification, was codified by Carl Linnaeus by means of his binomial system. The methodological brilliance of the system, based upon genus and species as the scientific name, was to simultaneously establish difference and relationship for every named organism. The genus encompasses groups of similar species. Thus the system is hierarchical, providing a simple glance of relationships. Genera are nested into families, families into orders and so on. Through many intellectual revolutions, the test of time firmly established the approach.

Acknowledgements:
We want to thank many for generously providing insights and information that made this work possible. Critical reading the manuscript by Dr. Ian Kitching and Jean Hexaire was a key task for which we can never show sufficient gratitude. Extensive comment and invaluable review was also provided by Kirby Wolfe, Daniel Herbin and Drs. Konrad Fiedler, Mike Collins, Paul Goldstein, Andre Freitas, Marcelo Duarte, Felipe Amorim and Jim Tuttle. Most specimens illustrated are from the collections of Fernando Penco and Aldo Fortino. Additional distribution and life history data were provided by Jean Hexaire, Larry Valentine, Jim Tuttle, Jeffery S. Pippen, Bill Oehlke, Lucio Coronel, Aldo Fortino, Kirby Wolfe, Ulf Drechsel, Leroy Simon, Anibal Gonzalez, Oz Rittner, Alejandro Borquez, Leonardo Aguado, Leandro Bersano, Gaston Zubaran, Adriana Zapata, Sergio Ríos, Dan Janzen and Winnie Hallwachs.

Data for images:
Collection data for each image is available on our website (below).

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Contact us:
The Lepidoptera Research Foundation, Inc.: www.lepidopteraresearchfoundation.org

"Nobody can understand biodiversity until they understand basic systematics and have performed a scholastic study with some small group of organisms. This must be done using specimens for which meaningful samples are available. Insects are perfect for this purpose."

Cover:
Rothschildia jacobaeae, a common species throughout the region. Image 1.5 x natural.